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VOICE OF THE ELECTRIC UTILITY INDUSTRY

TVA cuts work force by 20%

7500 let go; 3-year rate freeze; competition is key

KNOXVILLE, TN—In his first major action as TVA administrator, Marvin Runyon announced staff and contractor cuts of 7500 employees, 20 percent of the authority's work force. The reductions are to be completed by October as part of an overall reorganization.

In addition, the two Bellefonte nuclear units will be mothballed and work will be slowed on several other plants to focus efforts on TVA's nuclear restart, said the June 29 announcement.

Runyon, who took over at Tennessee Valley Authority in December 1987, said the cuts and restructuring would allow the utility to avoid rate increases for three years.

The initial estimate for next year's costs would have required $300 million more from ratepayers—about a 6-percent increase, Runyon said. Over the past three years, TVA has had an average annual rate increase of about 4.5 percent.

Reaction

Tennessee Governor Ned Ray McWherter said in a statement that a cabinet-level working group was established, with state representatives from labor, employment security and economic and community development, to extend the full resources of the state to the people affected by the TVA cuts.

"We welcome anything that TVA can do to improve efficiency and keep rates within a competitive range," said Ken Renner, a spokesman for McWherter.

Continued on page 18

Future Nuclear Plants

Under Construction

U.S.S.R. ●●●

News Briefs

JILL MINNER, Assistant Editor

International energy pact signed by U.S.

The Department of Energy has signed a pact drafted by the International Energy Agency (IEA) which calls for participation in the joint collection and dissemination of data on successful energy-efficient demonstration projects. Other nations that have signed the pact include: Austria, Denmark, Finland, Germany, Italy, Japan, the Netherlands, Norway, Portugal, Sweden, Switzerland and the United Kingdom. According to DOE, New Zealand is expected to sign the pact as soon as the country's parliament approves the move. As part of the agreement, the participating countries will fund a unit established in the Netherlands called the IEA Center for the Analysis and Dissemination of Demonstrated Energy Technologies. The unit will be used to gather and analyze data on projects in energy-efficient technologies, and will provide reports on the performance of demo projects, policy implications and market choices facing manufacturers and consumers. The unit will also be used to organize international seminars and conferences on practical applications for new technologies.

Boston Edison reports on Pilgrim's progress

Boston Edison Co. told the Nuclear Regulatory Commission (NRC) that, with the exception of a few remaining steps, its Pilgrim nuclear power plant is ready to restart and operate reliably. According to Boston Edison, the remaining steps include: 1) the NRC Integrated Assessment Team Inspection; 2) approval by the Boston Edison Board of Directors; and 3) permission to restart from the commission.

CMS says last financial steps taken for MCV

CMS Energy Corp. announced that the final agreements for the Midland Cogeneration Venture Limited Partnership have been executed. CMS said the agreements include equity contributions by its partners and completion of a $650-million bank loan. The loan was made to MCV by The First National Bank of Chicago and three co-managers: Swiss Bank Corp.; Algemene Bank Nederland N.V., Chicago branch; and the Bank of Montreal. Construction work began on the plant in April and commercial operation is scheduled for the first quarter of 1990, according to CMS.

Taxes still rising for PA public utils, says study

A recent study, conducted by the Pennsylvania Economy League (PEL), shows that state and local taxes paid by public utilities in Pennsylvania continue to grow in relation to the amount paid by other business and industry. The report, an update of PEL's 1982 study, is being printed and distributed by the Pennsylvania Electric Association (PEA). Although the rate of increase in utility tax payments has slowed, PEA says it still is higher than the rate of increase in total corporate taxes. "The electric utility industry's concern is that our customers, by law, pay in their rates the cost of providing service, which includes taxes," explained PEA President Vincent Butler. "...there are ethical, equity and public policy issues involved when taxes are levied against utilities," he continued. According to Butler, PEA hopes the study will bring attention to the need for tax reform in Pennsylvania.

CommEd says Zion-2 set generating record

Commonwealth Edison Co. announced that unit 2 of its Zion nuclear plant has become the first U.S. nuclear unit to generate 80 million MWh of electricity. The unit went into service in 1974 and has been operating continuously since October 1987, according to the utility.

Westinghouse to build low-level radwaste disposal facility in IL

Westinghouse Electric Corp. said it has been selected by state officials to build and operate a low-level radioactive waste disposal facility in Illinois. Under the terms of the contract, Westinghouse will design, construct, operate and, after 50 years, close the facility. Sargent & Lundy Engineers and Earth Technology Corp. will work with Westinghouse on the project. According to the company, its facility must be ready to receive low-level waste from Illinois and Kentucky by Jan. 1, 1993. Westinghouse said the final site selection will be made late next year.

O&R, IBEW agree to a three-year contract

Orange & Rockland Utilities, Inc. and employee members of the International Brotherhood of Electrical Workers have agreed to a three year contract. "From the outset of negotiations, a primary goal was to reach an agreement that best serves the interests of our customers. We've achieved that goal," stated Linda Winikow, O&R vice president of human resources and external affairs. The company said that union members had voted to ratify the agreement in June, following extended negotiations.

Women in Energy, Inc. celebrates anniversary

Women in Energy, Inc. will celebrate its 10th anniversary this month at the National Energy Conference in Wichita, KS. Scheduled speakers will include: U.S. Sen. Nancy Landon Kassebaum (KS); Dixie Lee Ray, former chairman of the Atomic Energy Commission and Governor of Washington; and Margaret N. Maxey, of the College of Engineering, University of Texas-Austin. Founded in 1978, Women in Energy, Inc. is a communications network designed to promote research, knowledge and understanding of all forms of energy.

Utilities fined by NRC

The Nuclear Regulatory Commission recently proposed the following fines:

Commonwealth Edison Co.
A $50,000 fine for violation of NRC security requirements at the Braidwood nuclear power station.

Illinois Power Co.
A $75,000 fine for failure to adequately test certain electrical components installed at the Clinton nuclear power station.

Southern California Edison
A $150,000 fine for alleged violations of NRC requirements governing environmental qualification of electrical equipment important to safety at Unit 1 of the San Onofre nuclear generating staion.

Tennessee Valley Authority
A $50,000 fine for two violations of NRC requirements which occurred during heatup of Unit 2 at the Sequoyah nuclear power plant.

Personnel changes announced at EEI

The Edison Electric Institute has named Thomas R. Kuhn executive vice president and chief operating officer. Kuhn previously served as EEI executive vice president-governmental affairs. Walker F. Nolan, formerly vice president-legislative affairs, was chosen as senior vice president responsible for governmental affairs activities. Others named to new posts include: Fred I. Denny, vice president-environment, fossil fuels and power production; and Peter B. Kelsey, vice president-law and corporate secretary. Kelsey will start on November 1. "These changes are part of EEI's strategic plan to meet the needs of the electric utility industry and better serve its members," said EEI President William McCollam Jr.

ANS officers named

The American Nuclear Society has elected Walter B. Loewenstein, of the Electric Power Research Institute, as its vice president/president-elect for 1988-89. E. Gail de Planque, of DOE's Environmental Measurements Laboratory, took over as president. The officers were elected at the ANS annual meeting in San Diego.

WPPSS reelects Halvorson as chairman

The Washington Public Power Supply System has reelected Carl M. Halvorson as chairman of its executive board, a position he has held since 1982. Other board members who were also reelected include: Paul Nolan, vice chairman; Cornelius Duffie, secretary; and Vera Claussen, assistant secretary.

Rancho Seco training programs receive national accreditation

According to the Sacramento Municipal Utility District, its Rancho Seco nuclear plant has been made a full member of the National Academy of Nuclear Training. Ten of Rancho Seco's training programs have now been accredited by the academy. "The accreditation places Rancho Seco in the top third of all U.S. nuclear plants for accredited training programs," noted Rancho Seco Nuclear Training Manager Paul Turner. "We have spent approximately three years analyzing and developing the programs necessary to meet the academy's extensive training requirements," he added.

WE provides economic development profiles

Wisconsin Electric Power Co. (WE) and the Southeastern Wisconsin Regional Planning Commission together profiled 60 cities, villages and towns in southeastern Wisconsin to promote economic development in the area. Information on population, income, education, taxes, housing, labor recreation and other pertinent factors are detailed in the profiles, as well as maps and graphs for reference. WE Economic Development Manager Kris Rappe said the profiles, "...can provide a company with much of the preliminary information it needs to assess a community and its development sites for business purposes." "We intend to use these profiles as part of our own ongoing economic development marketing efforts as well," Rappe added. "These are invaluable tools that will help communities market themselves as prospective business sites."

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AEP slams NY-OH acid rain compromise proposal

COLUMBUS, OH—Ohio Gov. Richard Celeste and New York Gov. Mario Cuomo announced a clean-air proposal as a compromise to legislation now stalled in Congress. The proposal aims to reduce deposits from sulphur dioxide and nitrogen oxide emissions by nearly 50 percent over the next 10 to 15 years.

But American Electric Power said its customers' bills would have to increase by an average of 15 percent over its seven-state service area to pay for the proposal. Residential and commercial customers would see increases of about 12 percent as a result of the June 6 Ohio-New York proposal, AEP said.

In addition, AEP warned that the cost of the proposal would end near-term investments in the nation's clean coal technology program.

"Our proposal reflects an agreement between the state that is the source of the greatest amount of sulphur dioxide emissions and the state that suffers the greatest adverse effect," Cuomo explained. "We hope it will break the congressional deadlock on acid rain."

Congress is considering various amendments to the Clean Air Act, including acid-rain legislation. Proposals are still in committees because of disagreements over the type and extent of the legislation. Included are proposals to substitute conservation for correction reducing utility expenses, but hitting mining interests hard.

But W.S. White Jr., AEP chairman, spoke out strongly against the governors' proposal. "As we have said many times, severe acid rain legislation would deal a crippling blow to some industries in the AEP service area at a time when they can ill afford it and at a time when our nation needs to enhance our industrial capability," he said.

Without federal cost-sharing, beginning in 1993, industrial customers of Ohio Power Co., an AEP subsidiary, could get a rate increase of as much as 24 percent, noted the utility.

"It seems so short-sighted to be required to spend limited capital funds on emission control systems for existing power plants rather than spending money on developing new ways to burn our nation's coal cleanly," White said. "You still have an old power plant when you're finished, and you don't have clean coal technology, either."

Would force PFBC cancellation

The Celeste-Cuomo proposal would offer new oil-import tax revenues to pay half the cost of scrubbers on existing plants, but would leave the annual operating and maintenance costs to utilities and their customers. The total cost of building and operating the new equipment would be paid 75 percent by customers and only 25 percent by a new imported oil tax.

White said if a proposal similar to that of the governors were passed, AEP would have to cancel its plans to build the nation's largest pressurized fluidized-bed-combustion facility at its Philip Sporn Plant, as announced May 20.

Proposal includes oil import tax

The joint proposal would:

- Create a 10-year, $2.5-billion, 50-percent matching-grant program for the demonstration of new clean coal technologies.
- Link acid rain controls with a program to expand the capacity and the fill rates for the Strategic Petroleum Reserve. It would increase the SPR to 1-billion barrels.
- Require petroleum importers to set aside 2 percent of all imports, or their equivalent, for placement in SPR. By shifting the cost of the reserve from taxpayers to oil importers, the proposal in-

Continued on page 12

Canada power sales may grow by acid rain rules, says AEP

COLUMBUS, OH—Canada, a strong supporter of stringent U.S. acid rain rules, would benefit by selling much more electricity to the United States if Congress passes such legislation, according to an American Electric Power official.

"If acid-rain legislation is enacted, the cost of coal-fired electricity in this country would be increased somewhere between 15 and 20 percent," said A. Joseph Dowd, senior vice president and general counsel of AEP.

Concern could be genuine

"I am not suggesting that their concerns about acid rain are not genuine. But the Canadians are well aware that by forcing further environmental controls on U.S. industry, they are going to be able to sell an awful lot more electricity to the United States."

Dowd made the comments for NBC's "Today Show."

AEP says Canada-to-U.S. electric sales have increased 81 percent in the past seven years, amounting to $1.5 billion (Canadian) in 1987. Canada is a major supplier to the State of New York, the Northeast and the Northwest, and is actively pursuing Midwestern markets, AEP claimed.

Keep that in mind

Strong acid-rain rules would mean that "Our plants would be shut down (due to a lack of market for their power) and, in many cases, the coal mines would be closed," Dowd contended. "I hope that the people who are watching in Washington keep that in mind."

Dowd told *EL&P* that with coal representing 87-percent of AEP's system-wide fuel mix, the company would be the utility hurt most by stringent acid-rain legislation. And Ohio Power has nearly 100-percent coal-fired capacity. In addition, AEP plants use primarily higher-sulfur coal available from Midwestern mines, Dowd explained.

Already an effort

He said 146 emission scrubbers are in operation and another 44 are under construction or planned on U.S. generating plants, but none are operating or being built on Canadian power plants.

Dowd said no scientific evidence shows that Midwestern industries and power plants cause higher acid levels in the lakes of the Northeast and Canada.

Current legislation

"Of the legislation in Congress now," Dowd said, "the Mitchell bill is the most extreme. If that passes, we would forecast rate increases approaching 20 percent on the average, with industrial rate increases near 30 percent."

SB 1894, sponsored by Sen. George J. Mitchell (D-ME), was passed out of committee last fall and awaits discussion on the Senate floor. Other, less-comprehensive proposals are still in committee. AEP's Carl W. Crawford said with the current session drawing to a close for the presidential conventions, immediate action is unlikely.

Utility pay rises 4.5% in 1988, lowest of all industries

NEW YORK—Utilities will increase salaries less this year than companies in the manufacturing, insurance, commercial banking or trade industries, according to The Conference Board's annual private-sector salary survey.

Pay hikes for the salaried U.S. workforce will average 5 percent this year and will be about the same in 1989. Comparatively, utility salaries will increase 4.5 percent this year and 4.7 percent in 1989.

Salary hikes will be largest in the insurance industry, where gains are expected to average 5.8 percent this year and 5.7 percent in 1989, the Board said.

Budgets held steady over two years

Salaried budgets have held even over the last two years, following almost steady declines from 1982 to 1986. For 1988, salaries of exempt workers will rise an average of 5 percent, the Board said.

The average increase in executive salaries will be 5.4 percent. Non-exempt salaries will gain 4.8 percent. Projections for next year are virtually the same in all three groups.

"Management appears determined to keep average salary increases to about 5 percent and not permit an upward escalation," noted Charles Peck, Board compensation analyst. "If inflation nudges up, however, as projected by The Conference Board's Economic Forum, it will be more difficult to hold the salary increase line at 5 percent."

The Conference Board is a nonprofit, non-partisan, economic research group supported by over 2700 companies, labor unions, government agencies, trade and professional organizations, libraries, colleges and universities.

Average Salary Increase Budgets: 1988 and 1989

Type of Business	1988 No. of Co.'s	1988 Median	Est. for 1989 No. of Co.'s	Est. for 1989 Median
All Industries				
Nonexempt	915	4.8%	372	4.8%
Exempt	831	5.0	377	5.0
Executive	584	5.4	367	5.3
Utilities				
Nonexempt	67	4.2%	47	4.2%
Exempt	95	4.5	50	4.7
Executive	74	5.2	43	5.2
Manufacturing				
Nonexempt	245	4.8%	157	4.7%
Exempt	251	4.8	160	4.8
Executive	237	5.2	153	5.1
Insurance				
Nonexempt	87	5.7%	48	5.8%
Exempt	87	5.8	48	5.7
Executive	83	6.3	45	6.1
Commercial Banking				
Nonexempt	94	5.0%	53	4.8%
Exempt	94	5.0	52	5.0
Executive	90	5.3	51	5.3
Trade				
Nonexempt	51	5.0%	30	4.8%
Exempt	51	5.0	29	4.8
Executive	51	5.3	19	5.0

*Other industry groups are included in totals but not shown separately because of small samples.

Source: The Conference Board, May 1988 Salary Survey

Electroswitch acquires Westinghouse line

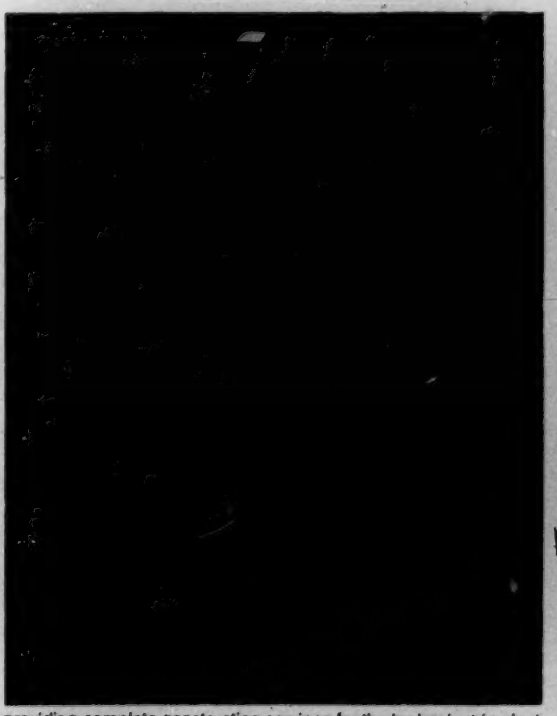
WEYMOUTH, MA—Electroswitch acquired the Type W, WL, W-2 and WL-2 instrument and control switch product line from Westinghouse Electric Corp. in July.

Transfer of all manufacturing and marketing functions from the Westinghouse facility at London, KY, should be completed by the end of August.

An Electroswitch representative said the line is a logical extension of the firm's existing power rotary switch and auxiliary relay lines.

Electroswitch is a major supplier of rotary switches and control devices for the electrical utility, industrial and military markets and has been in business for over 42 years.

Hydro station is largest run-of-river



When it is finished, Dominion Capital Inc. and Catalyst Energy each will own 50 percent of the largest hydroelectric project currently under construction in the United States. The eight turbines (three of which are shown being built in a shipyard near New Orleans) will generate 192 MW in 1990. They will be installed next to the Mississippi River, 45 miles south of Vidalia, and 100 miles northwest of New Orleans. When completed, the powerhouse structure will be barged up the Mississippi (river levels and government dredging operations willing) to the Sidney A. Murray Jr. Hydroelectric Station. Electricity generated at the station will be sold under a 43-year, fixed-price agreement to the town of Vidalia and Lousiana Power & Light Co., a subsidiary of Middle South Utilities Inc. Construction is more than 25-percent complete, including dredging operations by the contractor at the site to make a channel for water to flow from the river through the plant. Dominion Capital is the investment subsidiary of Dominion Resources Inc. Ebasco Contractors Inc. is providing complete construction services for the hydroelectric plant under a fixed-price, fixed-schedule contract.

COMMENTARY

Power imports, U.S.-Canada trade pact are no panacea for utilities' problems

Canadian electricity is making life more comfortable for New England and northern-tier state electric industry leaders. It offers the potential of low-priced energy for capacity-tight U.S. markets, based on low-cost hydro-generation. But if consumers on this side of the border believe that Canadian power is more than a temporary solution to local and regional power supply problems, they ought to rethink the situation.

The U.S.-Canada trade pact will smooth trade between our two countries in many areas. But for electric utilities, the effect will be minimal. U.S. and Canadian utility executives will continue to negotiate contracts for U.S. utilities to buy Canadian electricity, and for Canadian utilities to sell their surplus electricity to American utilities, just as they have been doing.

Consumers and environmentalists south of the border see only good things resulting from the treaty, insofar as electricity is involved. They read and hear that most of the power being imported into the U.S. is low-cost hydroelectricity from plants completed in lower-cost construction days. They see no adverse impact on *their* environment, no land going for power plant construction, no pollution of the local skies or streams. No new plant construction by their local utility that could raise rates. It's almost like winning a piece of the lottery, without even risking the price of a ticket. Even regulators have jumped on the bandwagon.

But there is a flip side to the low-cost Canadian power deal. As Canadian Energy Minister Marcel Masse says, "the Agreement does not establish a continental energy policy." What this means is that U.S. utilities have no *right* to Canadian electricity. Canadian power will be made available to U.S. utilities so long as it is economically advantageous for Canadian utilities to offer it and so long as there is no domestic Canadian need for the power. So long as Canadian power is priced even minutely below U.S. utilities' real avoided cost for new capacity, Canadian utilities will be able to sell as much electricty to their American cousins as they desire at *their price*.

But the *ease* and *instant economy* offered by access to the Canadian power supply can be a real business soporific. They can lead to over-dependence and long-term problems. The greater the dependence of any individual utility on Canadian power, the less incentive there will be for that utility to build new capacity to serve its own growing customer demand. Besides, since customer growth tends to come in small increments, exercising options to buy a bit more Canadian power is an easy, economic decision, and one that won't rile regulators.

Canadian negotiators have a way of appearing to *lose* gracefully to U.S. negotiators, then walking away with most of the marbles. In past negotiations, take the Columbia River Treaty for example, that's why we seem to get what we want...but then end up paying the Canadians to build dams and other power facilities that will benefit them as much or more than they will U.S. interests.

Don't get me wrong. I like the Canadians. My wife came from there. And I respect them...for their honesty, openness, sense of fair play, their work ethic and business acumen, and for their sense of national purpose. Canadian power imports, in the short- to mid-term, can be good for both the U.S. and Canada. But customers of northern-tier state utilities looking northward for mid-to long-term solutions to their power-supply needs could become victims of treaty naivete.

Robert A. Lincicome, Editor-in-Chief

LETTERS

Status of COTP

On behalf of the Transmission Agency of Northern California, I want to clarify the status of the California-Oregon Transmission Project (COTP). The COTP is a proposal by nearly all the public and investor-owned utilities in California to build a 500-kV transmission line from Southern California to the San Francisco Bay area, adding 1600 MW of transfer capacity between the two regions. This new path for electricity will enable utilities in California and the Pacific Northwest to diversify power resources and provide more reliable and economical service to their electric customers.

The COTP was the subject of an article in the April issue of *EL&P*. The article informed your readers that the California Public Utilities Commission had rejected applications for Certificates of Public Convenience and Necessity for three investor-owned utilities to construct and operate the project. The story failed to mention that those three are not alone in planning to build the line.

In 1983, a group of California municipal utilities began actively studying construction of a new transmission line to the Northwest. Recognizing the importance of the COTP to their communities and to the overall regional transmission system, 15 publicly owned utilities proposed development of the COTP. This union of publicly owned agencies became the Transmission Agency of Northern California or TANC, a joint powers agency under the laws of California.

TANC is playing a major role in the planning and development of the COTP. It serves as project manager and lead agency under the California Environmental Quality Act. TANC will have the largest share of the project's capacity. The Western Area Power Administration is the lead agency under the National Environmental Policy Act.

Since the COTP was initiated, there has been considerable progress in making the project a reality. TANC and [WAPA] have completed and approved a combined Environmental Impact Statement/Report on the project. In addition to the decisions by [WAPA] and TANC, several other steps toward development of the COTP are planned—including decisions by the CPUC on participation by investor-owned utilities.

The project participants are currently working to continue development of the COTP on-schedule in spite of the difficulties faced by our investor-owned utility partners. The present plan calls for the completion of the COTP in the 1991-1992 time-frame.

In short, the COTP is alive and well and on-schedule, a message that might not be taken from your article.

Laura Edlin
Public Affairs Director
Calif.-Oregon Transmission Project
Sacramento, CA

What's so rare?

From your appeal for assistance in finding an engineering journalist it is obvious that your heart is in *EL&P* and its justification for the future.

You say, "So what's so rare?" And on this you are finding the message loud and clear: An engineering journalist similar to your own competence and perspective, or with the potentialities of becoming one, is not to be found.

I have found that your journal carries some important stories and some perceptive editorials. This was demonstrated in December 1981: "Is there a nuclear future, and does anybody really care?" Today you have the answer to this in great depth, but you show no signs of understanding the cause. If you did, you wouldn't have written the last two paragraphs of that [December 1981] editorial (or you would have said "inside" instead of "outside" [the industry]).

As long as you are creating a new opportunity in engineering journalism, I hope that you will shoot very high.

Adolph J. Ackerman
Consulting Engineer
Madison, WI

Editor's note: We always shoot high...If we miss the target, it isn't from not trying.

UI, ESCO sign sale/leaseback agreement

NEW HAVEN, CT—United Illuminating Co. received $12 million in a sale/leaseback agreement with ESCO Inc. for six fuel-oil storage tanks in New Haven and Bridgeport, CT.

ESCO, based in Connecticut, will spend $1.6 million to repair two of the tanks and employ UI to do the repairs. The deal is expected to save customers $1 million a year through a fuel-adjustment clause.

UI will be able to purchase oil in tanker loads at lower prices than in barge loads, which is now the practice. The agreement, approved by state regulators in late April, is similar to a collateralized loan.

UI said it plans to repurchase the tanks for a nominal sum at the end of the seven-year leaseback term.

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Lasting support likely for faster tax payback

WASHINGTON—Customers would be better off financially if electric utilities quickly repaid about $10 billion in excess deferred federal income taxes, according to a study released by the National Association of State Utility Consumer Advocates and endorsed by the National Association of Regulatory Utility Commissioners.

After the 1986 Tax Reform Act, utilities no longer owed the money collected to pay for future federal taxes at the 46 percent maximum corporate tax rate. The rate was reduced to 34 percent. Section 203(e) of the act prolongs the refund of this money by tying it to the regulatory book lives of utility assets.

NASUCA, NARUC and others support legislation, HR 1049, sponsored by Rep. Byron Dorgan (D-ND), which would repeal Section 203(e). Repeal would let state regulators decide over what period of time refunds should be paid, according to each utility's financial ability.

Sources say the legislation, still in committee, probably will not reach the house floor this session. Dorgan and supporting groups plan to reintroduce and support the measure next session.

Recent studies by Exeter Associates, a Washington, DC, utility analysis firm, and NARUC say state regulators are not likely to demand repayment in an unreasonably short time, said NASUCA.

After the 1979 cut of the maximum federal corporate tax rate from 48 percent to 46 percent, only three states required one-year refunds, NARUC noted. The Exeter study, which focused on telephone utilities, explained that a five-year refund scenario would cause just a 2-percent reduction in cash flow. Such a rate of refund still would allow funding of nearly 100 percent of its dividends and construction from internal funds.

Consider electric utilities carefully

NASUCA's Daniel Clearfield said that state regulators would have to consider electric companies' refunds more carefully. Some electric utilities, unlike relatively strong telephone companies, have not fully recovered from massive construction programs, Clearfield pointed out.

David M. Barasch, NASUCA president, noted that "HR 1049 will provide state utility commissions with the flexibility and discretion to implement refund schedules appropriate to local circumstances."

Other groups supporting the legislation include American Public Power Association, Consumer Federation of America, Citizens for Tax Justice, and Environmental Action.

The Top 100 electric utilities' 1987 operating performances

Henry Stein
Engineering Editor

BARRINGTON, IL – Electricity has become even more vital, not just in the United States, but all over this globe of ours. However, even in this country, worries are surfacing about its future reliability and affordability.

Noted Robert Scherer, chairman of the Edison Electric Institute, in the next 15 years "we will find our dependence on electricity to be even greater than it is today," and, "so much income, comfort, health and security-creating activity will depend on an uninterruptible flow of electricity."

Because of these reasons, the Electricity Futures Project, led by EEI, identified factors which will affect future demands for electricity:

(1) Residential-sector electricity usage will increase, reflecting a higher per-capita and household income, and a desire for convenience equipment in homes.

(2) The commercial sector will need more power because of growth in service and trade employment. Productivity enhancements in services will require mass data transmission, more sophisticated controls in manufacturing, computerized product design, and diagnostics equipment in the medical field.

The industrial sector will need more and higher-quality power to improve productivity, increase automation and serve more process heating.

William McCollam Jr., president of EEI, said, "While use of all forms of energy grew by 2 percent between 1973 and 1987, electricity use increased over 42 percent. Electricity generation now accounts for more than 51 percent of all the primary energy use in the U.S., excluding transportation." He added that a recent national study of residential customers showed that they want and need good reliability in their electrical supply.

Nuclear far from dead

Nuclear power continued its slow climb into the worldwide generation field, in spite of the cutoff of planning and building of new plants in this country. The number of operating, commercial, nuclear electric plants worldwide topped the 400 mark in 1987. Of these, 109 were in the United States, according to a survey performed by the U.S. Council for Energy Awareness.

The nuclear generating capacity in the U.S. reached 97,243 MWe, going by the USCEA records. This was 18 percent of the electricity produced in this country last year. The organization also pointed out that oil, in spite of its recent price declines, continued to lose ground as a fuel of choice in electric utilities throughout the world.

And *Nuclear News* pointed out that most of this country's nuclear power plants showed steady improvement in their capacity factors during the years of 1985-1987, inclusive. The median capacity factor for operating nuclear plants was 63.3 percent for '85-'87; for '82-'84, the median was 59.5 percent.

In addition, the number of plants with capacity factors of more than 80 percent rose from four to ten, and those with factors of more than 70 percent climbed from 16 to 28.

Summarizing this report

And what do the figures collected and analyzed by *EL&P* from the 100 largest investor-owned electric utilities' (IOUs') Uniform Statistical Reports (USRs) and other sources show, to put all this into perspective? The smaller Tables 1-5 sum up some of the overall and more pertinent numbers. The large Tables 6-9 give the results from the individual utilities that made up the Top 100 investor-owned companies in 1987 (see *EL&P*, June 1987, pp. 19-23).

Unfortunately, all the information was not sent in by all of the Top 100 companies. But, since most did cooperate fully, the tables give a good picture of the year's operations.

Summing up some overall results experienced by those Top 100, their power plants reversed the downward trend in coal usage in 1987, and oil continued its slide. Natural gas began to gain favor in the industry (See Table 1).

Seasonal peaks climbed last year by 2 percent more than the year before (see Table 2). And, of course, new peaks are currently being hit through much of the country this year (which will be reported as they occur and reflected in next year's *EL&P* operating report).

But these new, higher peaks were not matched by increases in the utilities' capacities, as was shown graphically by the drop in the overall reserve margin from 24.5 percent in 1986 to approximately 22 percent in 1987.

In point of fact, many utilities are reporting difficulty in keeping up with demand in this next, hot, dry summer of 1988. Even Commonwealth Edison, serving Chicago and Northern Illinois – reviled by its critics for overbuilding power plants, and in particular nuclear plants – recently noted that the peaks predicted by those very same critics for the year 2000 were already surpassed in 1987.

And the company-owned, overall reserve margin for the Top 100 also dropped from 16.9 percent in 1986 to only 16 percent in '87.

The Utility Data Institute's 1988 late-June figures pointed out a major part of the problem. Only two new, electric-utility-owned, coal-fired, power plants were finished and started operating this year so far. This was the smallest number since utilities began building coal-fired plants to produce baseload electricity for the national grid early in the century. And a total of only four new plants are planned for completion in 1989, two in 1990, three in 1991, and two in 1992, according to UDI.

Meanwhile, there will be no new nuclear power plants after the mid-1990s. During that time period, the last new nuclear plants will either enter commercial service or have been abandoned, mainly due to political reasons.

TABLE 1.
FOSSIL FUEL CONSUMPTION

	1986	Change	1987	Change
Coal (million tons)	505	–1.5%	933	+45.9%
Oil (million bbl)	185	+25.7%	171	–15.7%
Gas (billion cu ft)	2,077	–15.5%	2,176	+4.5%

TABLE 2.
PEAK DEMAND AND RESERVE MARGINS

	1986	Change	1987	Change
Seasonal Peak (MW)	395,347	+0.5%	379,475	–3.0%
Total System Capability (MW)	492,253	+2.3%	461,573	–6.6%
System Reserve Margin	24.5%		22%	
Total Owned Capability (MW)[1]	482,300	+0.2%	430,890	–2.1%
Owned Reserve Margin	16.9%		16%	
Average Load Factor	56.0		57.1	

TABLE 3.
TYPE OF GENERATION (MW)

Type	1986	Change	1987	Change
Conventional Steam & Combined Cycle	341,382	–0.3%	330,201	–3.4%
Hydro & Pumped Storage	23,326	0.9%	22,622	–3.1%
Gas Turbines & Internal Combustion	33,488	–0.8%	34,729	+3.6%
Nuclear	84,172	14.1%	87,134	+3.7%
Total	482,640	1.5%	454,680	–1.8%

Spending plans

A survey by *Power Engineering* magazine, found that utility spending plans look strong for the next three years. But most of the money will go to plant-modification and life-extension projects. Only 27 percent of company outlays currently are earmarked for new generating capacity.

Breaking out that amount from the approximately $3 billion involved leaves $810 million available to build this new capacity. In addition, an extrapolation of spending trends by the magazine led to the conclusion that the overall capacity factor for the utilities in this country can be expected to continue dropping at least through 1995.

As mentioned previously, the increase in generating capacity was not enough to keep up with the jump in usage in '87 (see Table 3). In steam generation capacity, still, of course, the major source of electric energy in the United States, a slight *drop* was seen in available generating power.

Thermal efficiencies

As might be expected with a sample of this size, overall heat rate changed very little compared to the year before. The median heat rate in 1986 was 10,610 Btu/kWh, and it was 10,564 in 1987.

But these numbers *are* significant when previous years are taken into account. The median thermal efficiency fell slightly in 1986 for the first time in five years, as shown by the increased heat rate. But then last year, efficiency improved again. Utilities must be doing something right.

For comparison, here are some figures on median heat rates for preceding years: in 1985, the median heat rate was 10,605 Btu/kWh; the heat rate was 10,616 in 1984; it was 10,650 in 1983; and 10,790 in 1982.

A newcomer to *EL&P*'s Top 100 leaped into the number one position in the heat-rate table as the most thermally efficient IOU in the country—Green Mountain Power of Vermont, with a rate of 9770 Btu/kWh. Green Mountain broke Commonwealth Energy's three-year stint as the record-holder.

American Electric Power moved up into the No. 3 slot from No. 5 in 1986. Southwestern Public Service moved from No. 7 to No. 4, and United Illuminating went from eighth to fifth.

Unit heat rates

Notice how the utilities which have the top overall heat rates also appear and reappear among the listings for operating the most-efficient, individual, generating units using fossil fuels (Table 4) and in those of the best, overall, baseload, fossil-fueled boilers (Table 5).

American Electric Power is No. 3 in the overall list and had the best individual unit (among utilities with high capacity factors) in Sporn Unit 5, with a heat rate of 8821. The company followed up in the Nos. 8 and 9 places for efficient individual units. Detroit Edison had the second-most efficient unit with Trenton Channel Unit 9, while being No. 15 in the overall table. Commonwealth Energy was No. 2 in overall heat rate and No. 3 with its Canal-1 unit. And then there is Duke Power, No. 14 in the overall-system list, but holding down spots number 4, 5, 6, 7 and 11 for individual units.

New to the list

New to this list, Atlantic Energy took

TABLE 4.
TOP GENERATING UNITS BY HEAT RATE
(capac. factor > 50%)

Rank & Unit	Capacity (MW)	Utility	Heat Rate (Btu/kWh)
1. Sporn-5	450	American Electric Power	8,821
2. Trenton Channel-9	500	Detroit Edison	9,040
3. Canal-1	572	Commonwealth Energy	9,048
4. Belews Creek-2	1,120	Duke Power	9,051
5. Marshall-4	660	Duke Power	9,053
6. Marshall-3	660	Duke Power	9,103
7. Belews Creek-1	1,120	Duke Power	9,142
8. Sporn-2	150	American Electric Power	9,214
9. Amos-2	800	American Electric Power	9,236
10. Bay Shore-4	215	Centerior Energy	9,265
11. Marshall-1	385	Duke Power	9,269
12. Bay Shore-1	136	Centerior Energy	9,279
13. Sporn-4	150	American Electric Power	9,300
14. Bay Shore-3	142	Centerior Energy	9,309
15. Bower-4	867	Southern Companies	9,313
16. Clinch River-2	235	American Electric Power	9,332
17. Marshall-2	385	Duke Power	9,345
18. Mountaineer-1	1,300	American Electric Power	9,360
19. Milliken-2	150	New York State Elec. & Gas	9,373
20. Edgewater-4	106	Wisconsin Public Service	9,374

Company	Rank	Heat Rate (Btu/kWh)	Up or Down	Coal (1000 tons)	Oil (1000 bbl)	Gas (1000 MCF)	Percent Change In Coal	Oil	Gas
Green Mountain Power	1	9,770	-	331	113	573	NA	NA	NA
Commonwealth Energy System*	2	9,909	U	0	8,218	4,841	-	-16	445
American Electric Power*	3	9,955	D	58,073	0	0	-5	-	-78
Southwestern Public Service	4	9,994	D	7,202	3	75,663	6	50	-10
United Illuminating	5	9,994	D	767	6,691	2,966	3	0	3111
DPL*	11	9,994	U	5,671	0	0	6	-100	-100
Cincinnati Gas & Electric	12	9,998	U	7,998	1,107	74	3	9415	19
Potomac Electric Power	13	9,998	D	8,472	2,578	6,824	2	-40	-
Duke Power	14	10,024	U	8,783	188	179	-21	84	-46
Detroit Edison	15	10,060	D	19,396	517	2,369	21	42	-52
Cilcorp*	21	10,151	U	2,280	0	19	8	-	-7
Centerior Energy*	22	10,174	U	2,262	7	5	-9	250	-90
Central Hudson Gas & Electric	23	10,270	U	414	3,586	6,026	NA	-40	992
Union Electric	24	10,347	D	10,261	40	574	3	-52	93
Pennsylvania Power & Light	25	10,369	D	424,345	7,025	0	4078	-24	-
General Public Utilities*	27	10,375	D	7,419	422	32,702	6	-76	98
Dominion Resources*	28	10,382	D	9,837	5,400	2,800	0	-9	777
Niagara Mohawk Power	29	10,412	D	2,805	7,161	28,675	14	-58	57
Gulf States Utilities	31	10,436	U	1,976	220	188,214	-25	-50	-3
Illinois Power	32	10,446	U	7,378	10	446	-5	-50	11
Duquesne Light	33	10,449	U	4,561	64	205	-5	-10	28
Midwest Energy*	34	10,455	U	1,895	33	1,554	-2	267	380
Houston Industries*	35	10,457	U	15,998	155	282,246	83	25	-8
Utah Power & Light	37	10,479	D	8,098	48	86	88	0	-31
Atlantic Energy*	38	10,485	D	1,053	1,462	8,351	0	14	89
Carolina Power & Light	39	10,488	U	8,535	10	175	-10	-44	-67
Long Island Lighting	41	10,509	D	0	17,886	24,151	-	15	-1
Wisconsin Power & Light	42	10,510	U	3,866	19	222	2	-21	13
Idaho Power	43	10,513	D	2,983	0	4	124	-100	-30
San Diego Gas & Electric	44	10,523	D	0	261	52,591	-	-80	63
Baltimore Gas & Electric	45	10,539	U	4,076	2,442	4,149	0	72	347
Sierra Pacific Power	47	10,540	D	1,027	388	1,488	21	24	0
Central Maine Power	48	10,559	D	0	2,277	0	-	-2	-
Hawaiian Electric*	49	10,560	U	0	11,778	3	-	5	-
Wisconsin Public Service	61	10,720	D	3,406	29	281	3	-17	218
Southern California Edison	62	10,739	-	5,251	1,348	186,531	0	0	0
Pinnacle West Capital*	63	10,740	D	5,972	80	4,632	8	627	-54
Northern States Power	64	10,741	U	9,491	90	2,104	42	-4	203
Middle South Utilities*	65	10,792	D	7,510	206	166,336	-9	-80	-10
Iowa Southern*	67	10,797	-	1,250	43	0	NA	NA	NA
Consolidated Edison	68	10,815	D	0	18,516	84,888	-	5	11
Pacificorp	69	10,828	D	12,374	62	0	21	-8	-
Illinova Corp.	70	10,844	U	1,884	3	14	-11	-67	77
Minnesota Power	71	10,847	D	3,539	0	3	22	-	3
Iowa-Illinois Gas & Electric	72	10,856	U	2,445	13	522	0	18	-15
Philadelphia Electric	73	10,867	U	2,990	5,084	1,392	23	13	69500
Portland General*	74	10,884	D	894	0	0	0	-100	-
Iowa Resources*	75	10,891	U	1,843	14	529	-10	-30	-153
Public Service of Colorado	76	10,910	U	6,168	30	108,846	-8	3	6838
Washington Water Power	77	10,914	U	1,455	2	8	34	0	-67
Wisconsin Energy*	78	10,928	-	6,894	110	674	0	0	0
Puget Sound Power & Light	79	10,941	U	2,793	8	90	12	60	43
Texas Utilities*	80	10,942	U	38,369	385	258,722	4	219	4
Entech	81	10,947	D	3,234	11	470	7	22	14
Nevada Power	82	10,963	D	2,369	80	3,836	-2	-17	14
Madison Gas & Electric	83	10,987	D	789	4	519	16	-50	-45
Kansas Gas & Electric	84	11,010	U	3,165	0	5,765	17	-	-20
Commonwealth Edison	85	11,017	U	12,419	3,162	324	-9	-23	-91
Oklahoma Gas & Electric	86	11,048	U	8,318	14	87,470	1	-42	6
Tucson Electric Power	87	11,126	U	1,881	0	3,259	-4	-	25
Central Vermont Public Service	88	11,182	U	431	83	0	78	0	-
Interstate Power	89	11,201	D	1,464	9	916	1	-55	18
Empire District Electric	90	11,233	U	1,191	7	171	3	-44	-58
KPL Gas Service	91	11,324	D	5,948	18	2,149	-1	84	75
IE Industries*	92	11,359	U	1,080	22	316	6	47	51
Public Service of New Mexico	93	11,529	D	3,460	4	251	-8	-81	-72
Otter Tail Power	94	11,709	D	1,019	3	0	-43	0	-
FPL Group* (FP&L)	95	11,728	U	3	20,067	133,494	13700	-18	-9
Sierra Pacific Power	96	11,800	-	1,027	388	1,488	21	24	0
TNP Enterprises* (Texas-New Mexico Power)	97	>20,000	-	0	0	2	-	-	-50
Public Service of New Hampshire	98	NA	NA	NA	NA	NA	NA	NA	NA
Pacific Gas & Electric	99	NA	NA	NA	NA	NA	NA	NA	NA
New England Electric	100	NA	NA	NA	NA	NA	NA	NA	NA

[1] Wood [2] Lignite only NA Not Available 0 Less than 1% change (when in change columns) - Zero amounts in both years

*Holding company

Company	Season Peak (MW)	Change (%)	Winter (W) or Summer (S)	Total System Capacity at Time of Peak (MW)	Total System Reserve (%)	Owned Capacity At Peak (MW)	Owned Reserve (%)	Load Factor (%)
[illegible]								
American Electric Power*	16,551	-9	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Atlantic Energy*	1,600	4.6	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Baltimore Gas & Electric	5,150	10.6	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Boston Edison	2,477	3.5	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]								
Central Hudson Gas & Electric	955	7.9	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Central Illinois Public Service	1,655	8.7	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Central Louisiana Electric	1,141	-8.6	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Central Maine Power	1,488	8.1	W	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Central Vermont Public Service	384	1.9	W	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]								
DPL*	2,357	4.9	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Delmarva Power & Light	2,094	13.9	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Detroit Edison	8,427	4.7	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dominion Resources*	11,539	11.3	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Duke Power	12,691	8.8	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]								
FPL Group* (FP&L)	12,394	2.1	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Florida Progress* (FPC)	3,166	-13.1	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
General Public Utilities*	7,316	10.7	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Green Mountain Power	269	NA	W	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Gulf States Utilities	4,991	-1.6	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]								
Illinois Power	3,060	4.8	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Interstate Power	982	7.5	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Iowa Resources*	1,276	8.3	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Iowa Southern*	479	NA	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Iowa-Illinois Gas & Electric	1,087	8.1	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]								
Kansas City Power & Light	2,531	6.7	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Kansas Gas & Electric	1,426	1.8	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Kentucky Utilities	2,457	1.6	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Louisville Gas & Electric	1,861	-3.2	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Madison Gas & Electric	477	8.7	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Middle South Utilities*	11,270	-3.7	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Midwest Energy*	981	NA	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Minnesota Power	1,117	8.9	W	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]								
Nevada Power	NA	NA	NA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
New York State Electric & Gas	5,830	12.9	W	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Niagara Mohawk Power	5,705	1.0	W	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Northeast Utilities	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Northern Indiana Public Service	2,384	8.0	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Northern States Power	6,377	6.1	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Ohio Edison	4,579	7.9	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Oklahoma Gas & Electric	4,830	0.3	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Orange & Rockland Utilities	882	8.5	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Pacific Gas & Electric	NA	NA	NA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
PacifiCorp	4,139	7.7	W	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Pennsylvania Power & Light	6,691	8.4	W	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Philadelphia Electric	8,881	8.1	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Pinnacle West Capital*	3,199	-0.9	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Portland General*	2,809	8.6	W	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Potomac Electric Power	5,198	9.6	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Public Service Enterprise Group*	8,173	8.7	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Public Service of Colorado	3,256	4.7	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Public Service of New Hampshire	NA	NA	NA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Public Service of New Mexico	910	8.6	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Puget Sound Power & Light	3,555	8.0	W	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SCANA Corporation* (SCE&G)	2,843	8.2	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
San Diego Gas & Electric	2,378	0.1	W	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Savannah Electric & Power	592	-0.5	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sierra Pacific Power	813	14.8	W	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Southern California Edison	14,899	0.9	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Southern Indiana Gas & Electric	614	8.8	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Southwestern Public Service	2,088	8.4	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TECO Energy*	2,448	-7.8	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Texas Utilities*	18,680	0.9	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Tucson Electric Power	1,171	1.7	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Union Electric	6,836	8.0	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
United Illuminating	1,072	8.3	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Utah Power & Light	3,084	-2.8	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Utilicorp United	1,760	8.8	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Washington Water Power	1,849	8.8	W	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wisconsin Energy*	3,511	0.3	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wisconsin Power & Light	1,699	11.2	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

NA Not Available *Holding company

first place for best heat rates for all its fossil-fueled boilers, at 9208 Btu/kWh. Second place in this category was taken by another newcomer to the list, Baltimore Gas & Electric, with a fossil-fueled heat rate of 9291 Btu/kWh. But there comes Duke Power again in third place with a 9362. Centerior Energy and CMS Energy took Nos. 4 and 5 spots with 9648 and 9669 Btu/kWh, respectively.

Coal usage

Coal use by the Top 100 increased by 45.9 percent in 1987 compared to 1986, to 933-million tons from 505-million tons. (Totals mentioned in this report are adjusted values that reflect the change in mix of the Top 100 companies between 1986 and 1987.)

In 1987, the top users of coal burned these amounts, in descending order of magnitude:

- Southern Co.—consumption up 3 percent this year to 44-million tons.
- American Electric Power—down 9 percent to 38-million tons.
- Texas Utilities—down 9 percent to 29-million tons.
- Detroit Edison—up 21 percent to 19.3-million.
- Allegheny Power—increased 12 percent to 16.4-million tons.
- Commonwealth Edison—decreased 9 percent to 12.4-million.
- PacifiCorp—up a whopping 21 percent to 12.4-million.
- Central & South West—down again by 9 percent to 11.8-million tons.
- Public Service of Indiana—about the same as last year, at 10.9-million.
- Ohio Edison—also down, by 3 percent, to 10.8-million tons.

Oil use

Changes in oil prices appear to have had their effect last year on the utilities. In 1986, usage climbed by a whopping 25.7 percent. But 1987 saw an almost-as-dramatic drop of 15.7 percent. Now that prices have gone down in 1988, next year's report may show another reversal in the figures or a continued slide in oil use as utilities decide that it costs too much and is too complicated to try to keep up with the Middle-East-constructed price rollercoaster.

Utilities that had the largest changes in oil consumption between 1986 and 1987, and used more than one-million barrels during 1987 included:

- The largest percentage drop by far was recorded by Public Service Enterprise Group—down a whopping 57 percent to 2.6-million barrels.
- A close second was Eastern Utilities Associates—reduced use by 52 percent to 2.8-million barrels.
- A still-close third was Potomac Electric Power—down 45 percent to 2.4-million barrels.
- Fourth was Central Hudson Gas & Electric—down by 40 percent to 3.6-million barrels.
- Next was Niagara Mohawk Power—down 26 percent to 7.2 million barrels.

Several of the Top 100 utilities, however, bucked the trend and increased their oil use. Chief among these was:

- Baltimore Gas & Electric Co.—up by

55 percent to 2.2-million barrels of oil.
• Next was Long Island Lighting—up 15 percent to 17.9-million bbl.
But those two were pretty much alone among the large oil users in increasing their consumption by any significant amounts.

Natural gas use

Overall use of natural gas by the Top 100 IOUs also climbed, by 4.5 percent, according to their filings. The largest percentage increases in consumption among those using at least one-billion cubic feet in 1987 were recorded by the following companies:
• United Illuminating—their figures show a gigantic increase of 3111 percent, from a mere 93,000 cu ft in 1986 to over 2.9-million cu ft in 1987.
• Central Hudson Gas & Electric shows up again—gas usage jumped 988 percent to 6-million cu ft.
• Dominion Resources—gas use increased 741 percent to 2.5-million cu ft.

These increases were matched by large reductions in natural gas consumption by a number of other utilities such as:
• Pinnacle West Capital—down by 89 percent to 1.1-million cu ft in 1987.
• Detroit Edison—reduced by 82 percent to 2.2-million cu ft.

No individual decreases as large as the single-company increases were recorded, and the many smaller decreases did not match increases, so overall gas usage increased.

(The great percent increase by Philadelphia Electric has been left out, since the company now submits a combined report for itself and its subsidiaries.)

Reserve capacity shrinks

A big worry among utilities is the diminishing reserve capacity they see already and predict for the near future. The year 1982 appears to have been a watershed in this respect, with a system reserve of 29 percent.

The Top 100 increased their total system capability 2.3 percent in 1986, but only by an anemic 0.2 percent in 1987. And total system reserve margin (consisting of owned reserves and firm purchase contracts) declined from 24.5 to 22.0 percent.

Just looking at owned reserve margin showed another decrease from 16.9 percent in 1986 to 16 percent in 1987.

Average load factor climbed from 56.0

TABLE 5.
TOP SYSTEM HEAT RATES, FOSSIL-FUELED BOILERS

	Utility	Heat Rate (Btu/kWh)
1.	Atlantic Energy	9,309
2.	Baltimore Gas & Electric	9,291
3.	Duke Power	9,362
4.	Centerior Energy	9,548
5.	CMS Energy	9,559
6.	United Illuminating	9,578
7.	New York State Elec. & Gas	9,597
8.	SCANA	9,660
9.	Florida Power	9,684
10.	Georgia Power	9,699

Company	Fossil (MW)	Fossil (%)	Fossil Last Year Change (MW)	Hydro & Pump Storage (MW)	Hydro & Pump Storage (%)	Hydro & Pump Storage Last Year Change (MW)	Diesel/Combustion (MW)	Diesel/Combustion (%)	Diesel/Combustion Last Year Change (MW)	Nuclear (MW)	Nuclear (%)	Nuclear Last Year Change (MW)

NA Not Available *Holding company

Company	Transmission: Below 189 kV (circuit miles)	Transmission: Miles Added	Transmission: 189 kV & Up (circuit miles)	Transmission: Miles Added	Distribution: Overhead: Below 22 kV (pole miles)	Distribution: Overhead: Miles Added	Distribution: Overhead: 22 kV & Up (pole miles)	Distribution: Overhead: Miles Added	Distribution: Underground: Below 22 kV (cable miles)	Distribution: Underground: Miles Added	Distribution: Underground: 22 kV & Up (cable miles)	Distribution: Underground: Miles Added
Allegheny Power System*	3,911	-5	1,[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
American Electric Power*	18,791	8	6,639	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Atlantic Energy*	1,188	0	63	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Baltimore Gas & Electric	4[illegible]	[illegible]	4[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Boston Edison	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Central Hudson Gas & Electric	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Central Illinois Public Service	4,[illegible]	41	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Central Louisiana Electric*	70[illegible]	-1	31[illegible]	14	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Central Maine Power	3,01[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Central Vermont Public Service	[illegible]	-1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
DPL*	1,[illegible]	-1	4[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Delmarva Power & Light	1,[illegible]	[illegible]	[illegible]	[illegible]	1,770	18	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Detroit Edison	4,[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dominion Resources*	2,[illegible]	-73	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Duke Power	3,[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
FPL Group* (FP&L)	2,[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Florida Progress* (FPC)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
General Public Utilities*	4,[illegible]	[illegible]	[illegible]	[illegible]	49,051	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Green Mountain Power	381	NA	NA	NA	2,214	NA	[illegible]	NA	[illegible]	NA	[illegible]	NA
Gulf States Utilities	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Illinois Power	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Interstate Power	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Iowa Resources*	1,113	-42	[illegible]	[illegible]	11,[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Iowa Southern*	[illegible]	NA	[illegible]	NA	[illegible]	NA	NA	NA	NA	NA	[illegible]	NA
Iowa-Illinois Gas & Electric	[illegible]	-1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Louisville Gas & Electric	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Madison Gas & Electric	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Middle South Utilities*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Midwest Energy*	[illegible]	NA	[illegible]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Minnesota Power	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Northern Indiana Public Service	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Northern States Power	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Ohio Edison	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Oklahoma Gas & Electric	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Orange & Rockland Utilities	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Pacific West Capital*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Portland General*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Potomac Electric Power	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Public Service Enterprise Group*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Public Service of Colorado	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SCANA Corporation* (SCE&G)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
San Diego Gas & Electric	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Savannah Electric & Power	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sierra Pacific Power	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Southern California Edison	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Texas Utilities*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Tucson Electric Power	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Union Electric	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
United Illuminating	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Utah Power & Light	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[1] Total all voltage levels
[2] Wire miles
[3] Pole miles
[4] Cable miles
[5] Line miles
[6] Conduit bank miles
[7] Trench miles
NA Not available and/or not applicable
- Miles not segregated
*Holding company

to 59.6 percent during the same period.

The pattern that is emerging is the one that worries the utilities so. Yet there seems to be more and more resistance among the general public to building new power plants. This also adds to the deep concerns of the utility executives.

Changes in generation

The world of the major utilities is changing in many ways, not the least being in the types of generation facilities they utilize. The preceding factors have combined to slow the introduction of new, large plants considerably. The total capacity of all conventional steam and combined-cycle plants actually decreased slightly from 1986 to 1987.

Hydro and pumped-storage plant capacity also went down, by a measurable 3.0 percent to 22.6 gigawatts.

As might be expected, gas-turbine and internal-combustion overall capacity rose 5.0 percent to 34.7 gigawatts. Nearing the end of the startup line, nuclear capacity for the Top 100 crept up a mere 0.8 percent to 67.1 gigawatts.

T&D moving ahead

Transmission and distribution is where things are happening in the utility field. A total of 1842 miles of transmission lines were added in 1987 for voltages of 189 kV and up.

Overhead distribution lines for under 22 kV increased by 4637 miles.

Underground distribution lines added on over 15,000 cable miles for lines of under 22 kV, while those for 22 kV and above added more than 5,000 cable miles.

Transmission additions

Those of the Top 100 that added the largest amount to their high-voltage transmission lines (189 kV and up) in 1987 were:

- Interstate Power—added 720 circuit miles.
- Middle South Utilities—added 495 miles.
- Southern Co.—466 miles extra.
- Dominion Resources—added on 403 miles.

Companies making the most additions to transmission lines below 189 kV included:

- Florida Progress—582 circuit miles.
- Southern Co.—537 circuit miles.
- General Public Utilities—453 miles.

Distribution add-ons

Not to be left out, the distribution side installed quite a few new lines, too. They included, for overhead lines for 22 kV and above:

- Southern Co.—1335 pole miles added in 1987.
- FPL—1001 pole miles added.
- Oklahoma Gas & Electric—plus 888 miles.

For underground lines handling 22 kV and higher, companies added the following:

- Southern Co.—2185 cable miles.
- Dominion Resources—918 miles.
- Commonwealth Edison—883 cable miles.
- Florida Progress—790 miles.